

SEQUENCE LISTING

<110> Ehrhardt, Thomas
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Zenner, Rita

<120> Plant dihydroorotase

<130> 0050/50716

<140> US 10/070,277
<141> Filing date not yet granted

<150> PCT/EP00/08581

<151> 2000-09-02

<160> 9

<170> WordPerfect version 6.1

<210> 1

<211> 1271

<212> DNA

<213> Solanum tuberosum

<220>

<221> CDS

<222> (9)..(1046)

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Leu Arg Asp Gly Asp Val Leu Lys Ala Val Val Ser His Ser Ala His
15 20 25 30

cac ttt ggg agg gca ata gtc atg cca aat ttg aag cct cct atc act 146
His Phe Gly Arg Ala Ile Val Met Pro Asn Leu Lys Pro Pro Ile Thr
35 40 45

acc act gct gct gta gca tac cgg gag gcg ata ttg aaa tct tta 194
Thr Thr Ala Ala Val Ala Tyr Arg Glu Ala Ile Leu Lys Ser Leu
50 55 60

cct gtt gat agt gat ttc aac cct ctt atg aca ctt tat ttg aca gat 242
Pro Val Asp Ser Asp Phe Asn Pro Leu Met Thr Leu Tyr Leu Thr Asp
65 70 75

aca acc agt cct atg gaa atc aaa cta gca aga gag agc cag gtc gta 290
Thr Thr Ser Pro Met Glu Ile Lys Leu Ala Arg Glu Ser Gln Val Val
80 85 90

ttt ggg gtg aag ttg tac cct gct ggt gcc acg aca aat tct caa gat 338
Phe Gly Val Lys Leu Tyr Pro Ala Gly Ala Thr Thr Asn Ser Gln Asp

95	100	105	110	
gga gtg act gat ctt ttc ggg aag tgt tta cca gtt cta caa gaa atg Gly Val Thr Asp Leu Phe Gly Lys Cys Leu Pro Val Leu Gln Glu Met 115 120 125				386
gtt gag cat aat atg cct ctg ctg gtt cat gga gag gtt act aat cct Val Glu His Asn Met Pro Leu Leu Val His Gly Glu Val Thr Asn Pro 130 135 140				434
gag gtt gac atg ttt gat aga gaa aag gta ttc att gaa acg gtt cta Glu Val Asp Met Phe Asp Arg Glu Lys Val Phe Ile Glu Thr Val Leu 145 150 155				482
aga ccg ttg gtg cag aaa ttt cca caa ttg aag gtc gtg atg gag cat Arg Pro Leu Val Gln Lys Phe Pro Gln Leu Lys Val Val Met Glu His 160 165 170				530
gtt acc acc att gat gct gtt aag ttt gtt gaa tct tgc act gaa gga Val Thr Thr Ile Asp Ala Val Lys Phe Val Glu Ser Cys Thr Glu Gly 175 180 185 190				578
ttt gtt gca gca act gtc acc cca caa cat ctt gtt ttg aac agg aat Phe Val Ala Ala Thr Val Thr Pro Gln His Leu Val Leu Asn Arg Asn 195 200 205				626
tct ctc ttc caa ggg ggc tta caa ccg cat aat tac tgc ctt cca gtc Ser Leu Phe Gln Gly Leu Gln Pro His Asn Tyr Cys Leu Pro Val 210 215 220				674
ctc aaa aga gag atc cac agg gag gca ctt gtg tca gct gta aca agt Leu Lys Arg Glu Ile His Arg Glu Ala Leu Val Ser Ala Val Thr Ser 225 230 235				722
gga agt aaa aga ttt ttt ctt ggg act gat agt gct cct cat gat aga Gly Ser Lys Arg Phe Phe Leu Gly Thr Asp Ser Ala Pro His Asp Arg 240 245 250				770
cga aga aaa gag tgt tct tgt gga tgt gct ggt att tac aat gca cct Arg Arg Lys Glu Cys Ser Cys Gly Cys Ala Gly Ile Tyr Asn Ala Pro 255 260 265 270				818
gta gcc ttg tca gta tat gcg aag gtg ttt gaa aag gaa aat gca ctc Val Ala Leu Ser Val Tyr Ala Lys Val Phe Glu Lys Glu Asn Ala Leu 275 280 285				866
gac aag ctt gaa gca ttc act agc ttc aat gga cca gat ttt tat ggg Asp Lys Leu Glu Ala Phe Thr Ser Phe Asn Gly Pro Asp Phe Tyr Gly 290 295 300				914
ctt cct agg aac aac tca aag att aag ttg agt aag acg cca tgg aag Leu Pro Arg Asn Asn Ser Lys Ile Lys Leu Ser Lys Thr Pro Trp Lys 305 310 315				962
gta ccc gaa tcc ttt tct tat gca tca gga gat att att ccc atg ttt Val Pro Glu Ser Phe Ser Tyr Ala Ser Gly Asp Ile Ile Pro Met Phe 320 325 330				1010
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Ala Gly Glu Met Leu Asp Trp Leu Pro Ala Pro Leu
 335 340 345

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 tcttttcttt catgttgatt agatattatc acgatgataa tatccttca gctaataaaat 1176
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 <212> PRT
 <213> Solanum tuberosum

<400> 2

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 35 40 45

Ala Ala Ala Val Ala Tyr Arg Glu Ala Ile Leu Lys Ser Leu Pro Val
 50 55 60

Asp Ser Asp Phe Asn Pro Leu Met Thr Leu Tyr Leu Thr Asp Thr Thr
 65 70 75 80

Ser Pro Met Glu Ile Lys Leu Ala Arg Glu Ser Gln Val Val Phe Gly
 85 90 95

Val Lys Leu Tyr Pro Ala Gly Ala Thr Thr Asn Ser Gln Asp Gly Val
 100 105 110

Thr Asp Leu Phe Gly Lys Cys Leu Pro Val Leu Gln Glu Met Val Glu
 115 120 125

His Asn Met Pro Leu Leu Val His Gly Glu Val Thr Asn Pro Glu Val
 130 135 140

Asp Met Phe Asp Arg Glu Lys Val Phe Ile Glu Thr Val Leu Arg Pro
 145 150 155 160

Leu Val Gln Lys Phe Pro Gln Leu Lys Val Val Met Glu His Val Thr
 165 170 175

Thr Ile Asp Ala Val Lys Phe Val Glu Ser Cys Thr Glu Gly Phe Val
 180 185 190

Ala Ala Thr Val Thr Pro Gln His Leu Val Leu Asn Arg Asn Ser Leu
 195 200 205

Phe Gln Gly Gly Leu Gln Pro His Asn Tyr Cys Leu Pro Val Leu Lys
 210 215 220

Arg Glu Ile His Arg Glu Ala Leu Val Ser Ala Val Thr Ser Gly Ser
 225 230 235 240

Lys Arg Phe Phe Leu Gly Thr Asp Ser Ala Pro His Asp Arg Arg Arg
 245 250 255

Lys Glu Cys Ser Cys Gly Cys Ala Gly Ile Tyr Asn Ala Pro Val Ala
 260 265 270

Leu Ser Val Tyr Ala Lys Val Phe Glu Lys Glu Asn Ala Leu Asp Lys
 275 280 285

Leu Glu Ala Phe Thr Ser Phe Asn Gly Pro Asp Phe Tyr Gly Leu Pro
 290 295 300

Arg Asn Asn Ser Lys Ile Lys Leu Ser Lys Thr Pro Trp Lys Val Pro
 305 310 315 320

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 325 330 335

Glu Met Leu Asp Trp Leu Pro Ala Pro Leu
 340 345

<210> 3

<211> 1962

<212> DNA

<213> Nicotiana tabacum

<220>

<221> CDS

<222> (305)..(1678)

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ttgtacactc ccattgtcgc ttccagttt gtgcacccaaa taacctttc agtcatttgt 180

atcttagcat caacaacagt tgctgtctct ctttgttcg tccaatatac tgagcatttt 240

tttagtagta atttgaaggg ttatttcgt tgtaaatat ttgattttt 300

gaaa atg aga caa agg gtt gga ttt gca ttg att aga gaa agc ttg tat 349
 Met Arg Gln Arg Val Gly Phe Ala Leu Ile Arg Glu Ser Leu Tyr

1 5 10 15

cgt aag cta aaa cca agc tct gtt ccc aga cat tat tgc act tct tct 397
 Arg Lys Leu Lys Pro Ser Ser Val Pro Arg His Tyr Cys Thr Ser Ser

20 25 30

tca gct aat gtt cct cct att cct cca cct aag att cct cat tct tct 445
 Ser Ala Asn Val Pro Pro Ile Pro Pro Pro Lys Ile Pro His Ser Ser

35 40 45

aaa aag gga agg ttg ttt aca gga gcc act att ggt cta cta ata gct	493
Lys Lys Gly Arg Leu Phe Thr Gly Ala Thr Ile Gly Leu Leu Ile Ala	
50 55 60	
ggg gga gct tat gca agt acg gtt gat gag gcc acc ttc tgt ggc tgg	541
Gly Gly Ala Tyr Ala Ser Thr Val Asp Glu Ala Thr Phe Cys Gly Trp	
65 70 75	
cta ttc tca gca aca aaa cta gta aat ccg ttc ttt gca ttt ctg gat	589
Leu Phe Ser Ala Thr Lys Leu Val Asn Pro Phe Phe Ala Phe Leu Asp	
80 85 90 95	
cca gag gtt gct cac aaa ctg gcg gtc tct gct gca gcc cga gga tgg	637
Pro Glu Val Ala His Lys Leu Ala Val Ser Ala Ala Ala Arg Gly Trp	
100 105 110	
gtt cca agg gag aag agg cca gat cct cct ata ttg ggc ctt gat gtg	685
Val Pro Arg Glu Lys Arg Pro Asp Pro Pro Ile Leu Gly Leu Asp Val	
115 120 125	
tgg gga aga agg ttc tca aat cct gtt ggt ctt gct gct ggt ttt gac	733
Trp Gly Arg Arg Phe Ser Asn Pro Val Gly Leu Ala Ala Gly Phe Asp	
130 135 140	
aag aat gct gag gct gtt gaa gga ttg ctt gga tta ggt ttt ggc ttt	781
Lys Asn Ala Glu Ala Val Glu Gly Leu Leu Gly Leu Gly Phe Gly Phe	
145 150 155	
gtt gag gtt ggc tca gta act ccc att cca cag gaa ggc aac cca aaa	829
Val Glu Val Gly Ser Val Thr Pro Ile Pro Gln Glu Gly Asn Pro Lys	
160 165 170 175	
cca cgt ata ttt agg ttg cca aat gaa ggt gct ata ata aat agg tgt	877
Pro Arg Ile Phe Arg Leu Pro Asn Glu Gly Ala Ile Ile Asn Arg Cys	
180 185 190	
ggc ttc aat agt gaa gga atc gtt gtg gtt gcc aaa cga ttg ggt gct	925
Gly Phe Asn Ser Glu Gly Ile Val Val Val Ala Lys Arg Leu Gly Ala	
195 200 205	
cag cat ggt aag aga aag ttg gaa aca tct agt act tca tct cca gct	973
Gln His Gly Lys Arg Lys Leu Glu Thr Ser Ser Thr Ser Pro Ala	
210 215 220	
gga gat gaa gtc aag cat gga ggg aaa gct ggt cct ggt att ctt ggt	1021
Gly Asp Glu Val Lys His Gly Gly Lys Ala Gly Pro Gly Ile Leu Gly	
225 230 235	
gtt aac ctt gga aag aat aaa aca agt gaa gac gct gca gca gat tat	1069
Val Asn Leu Gly Lys Asn Lys Thr Ser Glu Asp Ala Ala Asp Tyr	
240 245 250 255	
gtg caa gga gtc cat aca tta tct cag tat gct gac tac ttg gta att	1117
Val Gln Gly Val His Thr Leu Ser Gln Tyr Ala Asp Tyr Leu Val Ile	
260 265 270	
aat atc tca tcc cca aat act cca gga cta cgc cag ctt cag gga aga	1165
Asn Ile Ser Ser Pro Asn Thr Pro Gly Leu Arg Gln Leu Gln Gly Arg	

275	280	285	
aag cag ttg aag gat ctt gtg aag aag gtt caa gca gct cgt gat gaa	Lys Gln Leu Lys Asp Leu Val Lys Lys Val Gln Ala Ala Arg Asp Glu		1213
290	295	300	
atg cag tgg ggt gag gaa gga cct ccg cct tta ctt gtg aaa att gct			
Met Gln Trp Gly Glu Gly Pro Pro Pro Leu Leu Val Lys Ile Ala			1261
305	310	315	
cca gat ttg tct aaa caa gat ctt gaa gat att gca gtg gtg gct gtt			
Pro Asp Leu Ser Lys Gln Asp Leu Glu Asp Ile Ala Val Val Ala Val			1309
320	325	330	335
gct ctt cgt gtg gat gga ctg att ata tca aat act act gtc caa aga			
Ala Leu Arg Val Asp Gly Leu Ile Ser Asn Thr Thr Val Gln Arg			1357
340	345	350	
cca gat tcc ata agt caa aac cct gtg gct caa gag gct ggt ggc ttg			
Pro Asp Ser Ile Ser Gln Asn Pro Val Ala Gln Glu Ala Gly Gly Leu			1405
355	360	365	
agt ggg aag cca ctc ttt gac atg tca aca aat ata ctg aag gag atg			
Ser Gly Lys Pro Leu Phe Asp Met Ser Thr Asn Ile Leu Lys Glu Met			1453
370	375	380	
tac gtt ctg act aag gga agg att cct ctg att ggc act ggg ggt att			
Tyr Val Leu Thr Lys Gly Arg Ile Pro Leu Ile Gly Thr Gly Gly Ile			1501
385	390	395	
agc agt ggc gag gat gct tac aag aaa att cga gct ggt gcc act ctt			
Ser Ser Gly Glu Asp Ala Tyr Lys Ile Arg Ala Gly Ala Thr Leu			1549
400	405	410	415
gtt cag ctt tat aca gca ttt gca tat gga ggc cct gca ctt atc ccc			
Val Gln Leu Tyr Ala Phe Ala Tyr Gly Gly Pro Ala Leu Ile Pro			1597
420	425	430	
gat ata aag gat gaa ctt gct cgt tgc tta gaa aag gat ggt tat aag			
Asp Ile Lys Asp Glu Leu Ala Arg Cys Leu Glu Lys Asp Gly Tyr Lys			1645
435	440	445	
tca atc agt gag gct gtt gga gca gac tgc aga tagtagtagt tgatatacta			
Ser Ile Ser Glu Ala Val Gly Ala Asp Cys Arg			1698
450	455		
aaccagtctt ttgagtttga gggcagagc acatTTTgc cacttataat aaatgatata			
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			1962

<210> 4
<211> 458
<212> PRT

<213> Nicotiana tabacum

<400> 4

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				20				25				30			
Ala	Asn	Val	Pro	Pro	Ile	Pro	Pro	Pro	Lys	Ile	Pro	His	Ser	Ser	Lys
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Lys	Gly	Arg	Leu	Phe	Thr	Gly	Ala	Thr	Ile	Gly	Leu	Leu	Ile	Ala	Gly
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Gly	Ala	Tyr	Ala	Ser	Thr	Val	Asp	Glu	Ala	Thr	Phe	Cys	Gly	Trp	Leu
				65			70			75			80		
Phe	Ser	Ala	Thr	Lys	Leu	Val	Asn	Pro	Phe	Phe	Ala	Phe	Leu	Asp	Pro
				85				90				95			
Glu	Val	Ala	His	Lys	Leu	Ala	Val	Ser	Ala	Ala	Arg	Gly	Trp	Val	
				100				105			110				
Pro	Arg	Glu	Lys	Arg	Pro	Asp	Pro	Pro	Ile	Leu	Gly	Leu	Asp	Val	Trp
				115				120			125				
Gly	Arg	Arg	Phe	Ser	Asn	Pro	Val	Gly	Leu	Ala	Ala	Gly	Phe	Asp	Lys
				130				135			140				
Asn	Ala	Glu	Ala	Val	Glu	Gly	Leu	Leu	Gly	Leu	Gly	Phe	Gly	Phe	Val
				145			150			155			160		
Glu	Val	Gly	Ser	Val	Thr	Pro	Ile	Pro	Gln	Glu	Gly	Asn	Pro	Lys	Pro
				165				170			175				
Arg	Ile	Phe	Arg	Leu	Pro	Asn	Glu	Gly	Ala	Ile	Ile	Asn	Arg	Cys	Gly
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Phe	Asn	Ser	Glu	Gly	Ile	Val	Val	Val	Ala	Lys	Arg	Leu	Gly	Ala	Gln
				195			200			205					
His	Gly	Lys	Arg	Lys	Leu	Glu	Thr	Ser	Ser	Thr	Ser	Ser	Pro	Ala	Gly
				210			215			220					
Asp	Glu	Val	Lys	His	Gly	Gly	Lys	Ala	Gly	Pro	Gly	Ile	Leu	Gly	Val
				225			230			235			240		
Asn	Leu	Gly	Lys	Asn	Lys	Thr	Ser	Glu	Asp	Ala	Ala	Asp	Tyr	Val	
				245				250				255			
Gln	Gly	Val	His	Thr	Leu	Ser	Gln	Tyr	Ala	Asp	Tyr	Leu	Val	Ile	Asn
				260			265				270				
Ile	Ser	Ser	Pro	Asn	Thr	Pro	Gly	Leu	Arg	Gln	Leu	Gln	Gly	Arg	Lys
				275			280			285					
Gln	Leu	Lys	Asp	Leu	Val	Lys	Val	Gln	Ala	Ala	Arg	Asp	Glu	Met	

290

295

300

Gln Trp Gly Glu Glu Gly Pro Pro Pro Leu Leu Val Lys Ile Ala Pro
 305 310 315 320

Asp Leu Ser Lys Gln Asp Leu Glu Asp Ile Ala Val Val Ala Val Ala
 325 330 335

Leu Arg Val Asp Gly Leu Ile Ile Ser Asn Thr Thr Val Gln Arg Pro
 340 345 350

Asp Ser Ile Ser Gln Asn Pro Val Ala Gln Glu Ala Gly Gly Leu Ser
 355 360 365

Gly Lys Pro Leu Phe Asp Met Ser Thr Asn Ile Leu Lys Glu Met Tyr
 370 375 380

Val Leu Thr Lys Gly Arg Ile Pro Leu Ile Gly Thr Gly Gly Ile Ser
 385 390 395 400

Ser Gly Glu Asp Ala Tyr Lys Ile Arg Ala Gly Ala Thr Leu Val
 405 410 415

Gln Leu Tyr Thr Ala Phe Ala Tyr Gly Gly Pro Ala Leu Ile Pro Asp
 420 425 430

Ile Lys Asp Glu Leu Ala Arg Cys Leu Glu Lys Asp Gly Tyr Lys Ser
 435 440 445

Ile Ser Glu Ala Val Gly Ala Asp Cys Arg
 450 455

<210> 5
 <211> 15
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> by peptide synthesis

<400> 5

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<210> 6
 <211> 26
 <212> DNA
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<220>
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<400> 6

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<210> 7
<211> 27
<212> DNA
<213> Artificial Sequence

<220>
<223> primer

<400> 7

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<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> primer

<400> 8
aag gat cca tgg ccg gaa ggg ctg 24

<210> 9
<211> 44
<212> DNA
<213> Artificial Sequence

<220>
<223> primer

<400> 9

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